

Computer Audio Engineering

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June 2, 2008

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RE: *Taryn Christian vs. Richard Bissen, et al. Civil No. 04-00743-DAE-LEK*
Review of respondent's audio expert's report

Report

Assignment:

Computer Audio Engineering (CAE) was engaged to review the report and audio files submitted by respondent's audio examiner David Smith, of Sound Testimony of Johnstown, Pennsylvania.

Description of Material Provided:

1. Printed copy of a report dated March 7, 2008.
2. Printed copy of Mr. Smith's transcript of the recording of the conversation between the 911 Operator and Rob Perry. Mr. Smith designates this recording as Q1.
3. Printed copy of Mr. Smith's transcript of the August 17, 1995, telephone conversation between Taryn Christian and Lisa Kimmey. Mr. Smith designates this recording as Q2.
4. Printed copy of Q2 – Track Sheet of Segments from Christian/Kimmey telephone call on August 17, 1995.
5. Three (3) audio CDs containing Mr. Smith's enhancements of the audio provided to him.
 - a. Q1 – 911 Telephone Call – 911 Operator and Mr. Rob Perry.
 - b. Q2 – Telephone Call – Taryn Christian and Lisa Kimmey.
 - c. Q2 – Segments of Telephone Call – Taryn Christian and Lisa Kimmey.

Each item was initialed with a red "JM" for future identification.

Analysis:

An analysis of Mr. Smith's audio indicates that his work is technically flawed. Both audio recordings are of telephone conversations. The telephone employs a monaural signal (*i.e.*, a telephone signal contains a single audio channel, or is monophonic). Mr. Smith transferred the original telephone recordings onto his audio system for analysis and enhancement. He then

burned audio CDs of his enhanced final work product. The files on all audio CDs are two channel recordings (this is the specification of an audio CD). When a monaural file is converted to a two-channel file it should have an identical signal on both channels. The audio provided by Mr. Smith is binaural (two channel), but the information on the two channels is significantly different.

Although Mr. Smith's two-channel audio is from a single source, the signal on the left and right channels differ with regard to audio event alignment and amplitude (volume). There are even some audio events present on one channel but not on the other. This makes listening to the content of the audio files very difficult. The mismatched channels create an auditory illusion that the audio signal actually pumps from side to side. Moreover, the sound on each channel interferes with the perception of the sound on the other, obscuring the dialogue either partially or totally at points.

Substantiating evidence:

To illustrate the problems outlined above, CAE has done a comparative analysis. The recording from the CD provided by Mr. Smith, labeled, "Q1 – 911 Telephone Call", was compared to a recording created by CAE of the same source material. The source for both recordings was the 911 recording provided by the respondent (both Mr. Smith's and the CAE recordings were transferred from the same physical recording). The recording from Mr. Smith's CD contains his enhancements. The recording made by CAE has not been enhanced; it is the original transfer as a one channel source that was converted to a two channel digital file.

CAE then created graphical representations (waveforms and spectrograms) of segments from Mr. Smith's audio, and compared them to similar representations of corresponding segments from the CAE audio. A waveform is a graphical representation of amplitude within a left to right time line. A spectrogram is a graphical representation of the audio and includes time on a horizontal scale, frequency on a vertical scale and energy intensity (amplitude/volume) as relative lightness or darkness (or variation and color saturation) of the audio events represented within the viewing window. These files are located in appropriately named folders (specifically, in folders named 'Spectrograms' and 'Waveforms', which are located in the folder, 'Comparison Graphics') on the data DVD labeled *Christian 04-00743-DAE-LEK; Sound Testimony Review; Substantiating Evid. Data*, which accompanies this report. Files depicting segments from Mr. Smith's audio contain the prefix, "Sound-Testimony," and files depicting segments from the CAE recording contain the prefix, "CAE." The complete directory of this data DVD is listed in Table 1. The files should be compared pairwise. For example, the file named "Sound-Testimony-waveform-1.jpg" should be compared with the file named, "CAE-waveform-1.jpg," etc. Visual inspection of these graphical representations shows unequivocally that the left and right channels of Mr. Smith's recording are different from each other, whereas the left and right channels of the CAE recording are identical.

CAE also created video clips showing the waveform, playing in real time, and an analysis window. This analysis window shows frequency content of the two channels in the upper portion. A properly processed file will show a single line representing both channels (in fact, these are two lines, perfectly superimposed). The audio files provided by Mr. Smith show two

distinct lines, indicating the frequency content of the two channels is different. The lower portion of the analysis window indicates sound position within the sound stage (i.e., within the stereo field created by playing the left and right channels simultaneously from different speakers). A properly processed file will have a single line in the middle to indicate the sound is centered. Mr. Smith's audio shows continual movement, is spread all over the sound stage and the left and right channels are different. This evidence is definitive and incontrovertible.

These video clips are located on the data DVD mentioned previously, and are in a folder named, "Comparison Video Examples". The files are provided in both Quicktime and AVI formats. The Quicktime files provide better visual quality than their AVI counterparts. Both formats can be played on both Macintosh and PC (Windows) platforms; however, playing the Quicktime versions of the videos requires that the Quicktime program be installed. If the Quicktime program is not available, the AVI files may be played using Windows Media Player. Due to the large size of these files, it is recommended that the files be extracted to hard disk to avoid slow disk read stutters and errors. The Quicktime files are named, "CAE_video.mov" and "Sound_Testimony_video.mov." Their AVI counterparts are entitled, "CAE_video.avi" and "Sound_Testimony_video.avi."

Additional information:

Mr. Smith was able to verify the two statements of denial by Mr. Christian on the Christian/ Kimmey recording. The original recording of this conversation is of better quality than the 911 recording, and these statements can be heard on the original, without enhancement, by increasing the volume at the appropriate spot. The shortcomings of Mr. Smith's audio are less of a problem with better original audio and did not prevent him from verifying these statements. It is interesting to note that Mr. Smith did not include these two statements of denial on the CD of segments he made of the Christian/Kimmey recording.

Conclusion:

There is no doubt that the audio provided by Mr. Smith contains different information on the left and right channels. The fact that the channels are different makes it more difficult for the listener to hear and identify the content of the dialogue. It is not possible to determine what within Mr. Smith's work procedure caused the disparity, or where within Mr. Smith's workflow it occurred. The original Christian/Kimmey recording is of higher quality than the original recording of the 911 call. Consequently, the content of the dialogue is unambiguous when proper volume adjustments are made, even on Mr. Smith's recording. However, the original recording of the 911 call presents significant difficulties for the listener under the best of circumstances, because much of the significant dialogue is in the background, is of very low amplitude and is produced by speakers other than the two individuals actually conversing on the telephone. Therefore, it is not surprising that Mr. Smith was unable to verify some parts of the dialogue that had been transcribed earlier by CAE in 2007, and by a certified court reporter in 2000. Stated simply, the product Mr. Smith has produced is flawed and substandard.

Table 1: Directory of the data DVD labeled, *Christian 04-00743-DAE-LEK; Sound Testimony Review; Substantiating Evid. Data.*

Sound Testimony Data Files (Internal DVD name)

Comparison Graphics

Spectrograms

CAE-spectro-1.jpg

CAE-spectro-2.jpg

CAE-spectro-3.jpg

Sound-Testimony-spectro-1.jpg

Sound-Testimony-spectro-2.jpg

Sound-Testimony-spectro-3.jpg

Waveforms

CAE-waveform-1.jpg

CAE-waveform-2.jpg

CAE-waveform-3.jpg

Sound-Testimony-waveform-1.jpg

Sound-Testimony-waveform-2.jpg

Sound-Testimony-waveform-3.jpg

Comparison Video Examples

AVI for Macintosh and PC (Windows)

CAE_video.avi

Sound_Testimony_video.avi

Quicktime for Macintosh and PC (Windows)

CAE_video.mov

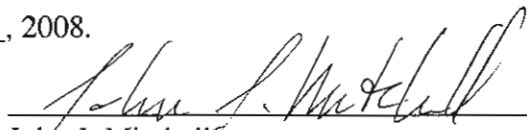
Sound_Testimony_video.mov

My compensation regarding the examination and analysis of the Sound Testimony report is \$1,975.00

ATTESTATION

I, John J. Mitchell, having been duly sworn, State that I have prepared the foregoing Sound Testimony review **REPORT** and that the contents therein are true and correct to the best of my knowledge and belief.

Dated this 2 day of June, 2008.




John J. Mitchell

Subscribed and sworn to me this 2 day of June, 2008 by John J. Mitchell.

Witness my hand and official seal.

My Commission expires: 4/25/2011



Notary Public



OFFICIAL SEAL
MARGARET PACHECO-BATTLE
NOTARY PUBLIC - STATE OF NEW MEXICO
My commission expires: 4/25/2011